LAND and Atmosphere Capability for EOS (LANCE)

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Earth Science Data and Information System (ESDIS) Project
September, 14 2011

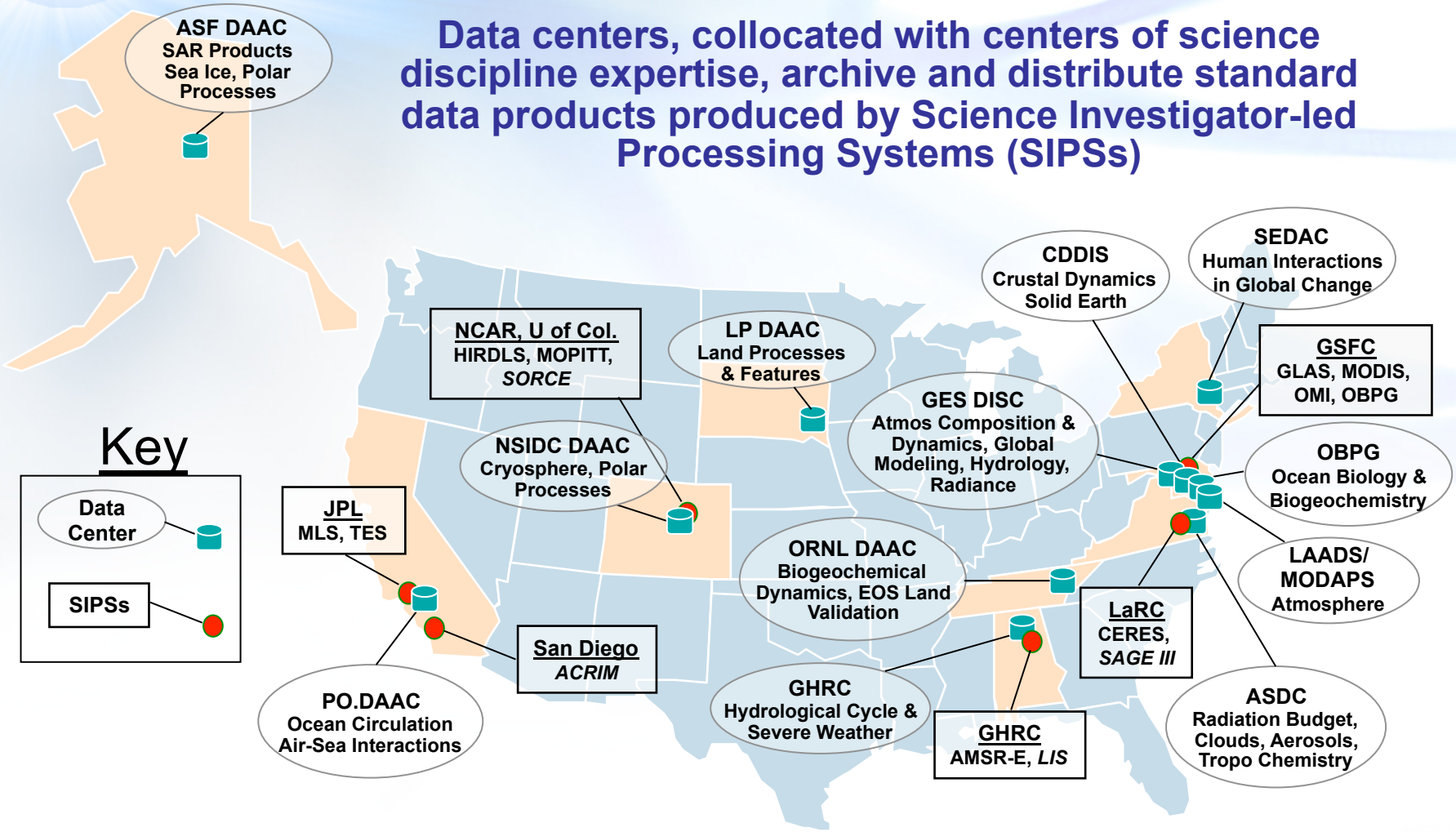
Earth Science Data and Information System (ESDIS) Project

- **The ESDIS Project is responsible for the Earth Observing System Data and Information System (EOSDIS), one of the largest civilian Science Information Systems in the world**

- **The EOSDIS:**
  - Ingests, processes, archives (~2.9 TB/day) and distributes (> 9.9 TB/day) science data for NASA's flagship Earth science missions
  - Supports unique requirements of a variety of Earth science disciplines (e.g., land, atmosphere, snow/ice, and ocean) as well as inter-disciplinary researchers, climate modelers, and application users (e.g., U.S. Forest Service)
  - Employs state-of-the-art hardware and software technology to achieve required data throughput
  - http://earthdata.nasa.gov

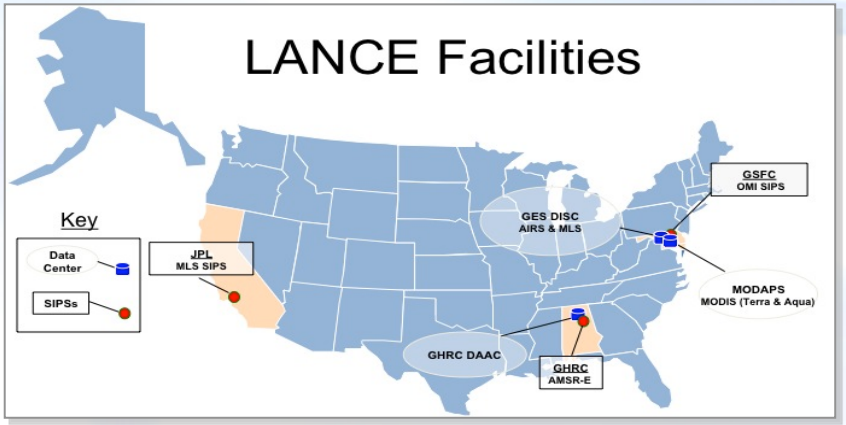
EOSDIS Facilities

Data centers, collocated with centers of science discipline expertise, archive and distribute standard data products produced by Science Investigator-led Processing Systems (SIPSs)



LANCE – A Component of EOSDIS

- The Land Atmospheres Near-real time Capability for EOS (LANCE) is a component of EOSDIS that generates and distributes products from 5 instruments:
  - *AIRS (Aqua) and MLS (Aura)*
  - *MODIS (Aqua and Terra)*
  - *OMI (Aura)*
  - *AMSR-E (Aqua)*



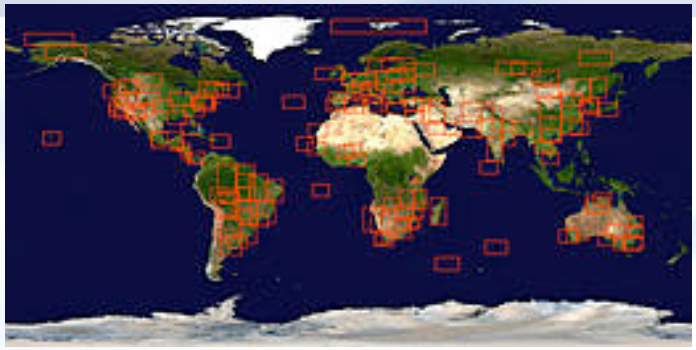
- LANCE Objectives:
  - *Leverage science processing expertise to create high quality NRT products*
  - *To provide Aqua, Terra, and Aura data to applications community within less than 2.5 hours of observation (The standard, science-quality products are typically available with a latency of 20-48 hours)*
  - *To provide data products with high reliability using redundant systems*
  - *To provide an umbrella environment with uniform high level requirements to foster coordination and cooperation between the individual elements*

- LANCE Web Site: *http://lance.nasa.gov*

Overview

Product Availability

- All data products are **freely available following self registration through FTP and HTTP servers**
- Both data and imagery are available
- Latency requirements necessitate relaxed ancillary data – in some cases there are significant differences between the near-real time and standard, science-quality data products
- U.S. and foreign Government agencies, universities and private industry are the primary application users
  - wildfires, floods, droughts, ash plumes, dust storms, and air quality.
- In excess of 1.3 TB of data products are distributed each day and approximately 50000 images are downloaded daily



Terra / MODIS

Product	Description	PGE	Volume (GB/day)	Browse
AM1EPHN0	Spacecraft Ephemeris Data	N/A	N/A	N/A
AM1EPHNE	Extrapolated Orbital Data	97	N/A	N/A
MOD00S	L0 PDS Data, Session-Based	N/A	N/A	N/A
MOD00F	L0 PDS Data, 5-Min Swath	95	N/A	N/A
MOD01	L1A Raw Radiances, 5-Min Swath	01	N/A	N/A
MOD03	Geolocation, 5-Min Swath 1km	01	N/A	N/A
MOD021KM	L1B Calibrated Radiances, 5-Min Swath 1km	02	N/A	L1B Radiances Browse
MOD02HKM	L1B Calibrated Radiances, 5-Min Swath 500m	02	N/A	L1B Radiances Browse
MOD02QKM	L1B Calibrated Radiances, 5-Min Swath 250m	02	N/A	L1B Radiances Browse
MOD02SSH	L1B Subsampled Calibrated Radiances, 5-Min Swath 5km	93	N/A	N/A
MOD07_L2	L2 Temperature and Water Vapor Profiles, 5-Min Swath 5km	03	1.83	N/A
MOD35_L2	L2 Cloud Mask, 5-Min Swath 250m and 1km	03	0.85	N/A
MOD04_L2	L2 Aerosol, 5-Min Swath 10km	04	0.15	L2 Aerosol Browse

LANCE in the News – 9/13/2011

Chesapeake takes a beating from storm

Chesapeake takes a beating from storm

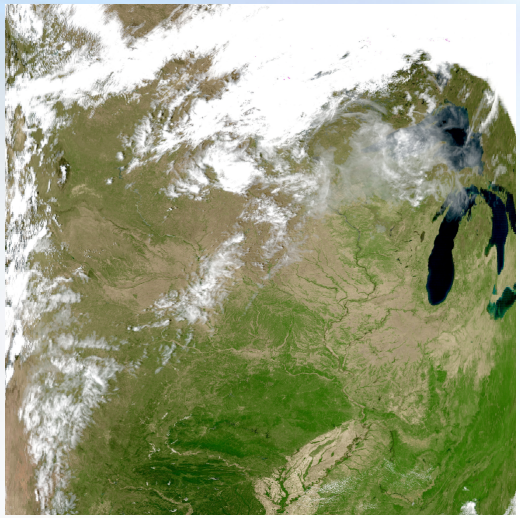
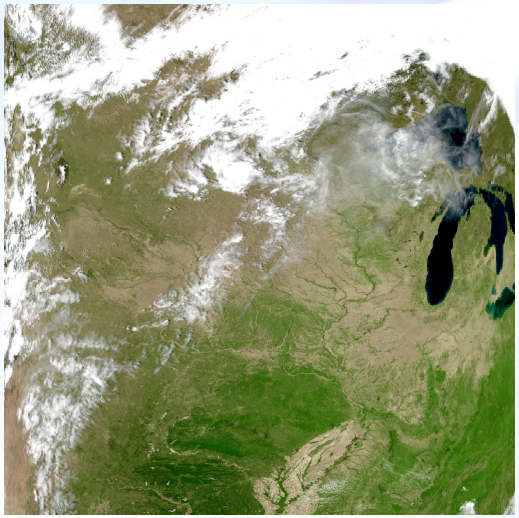
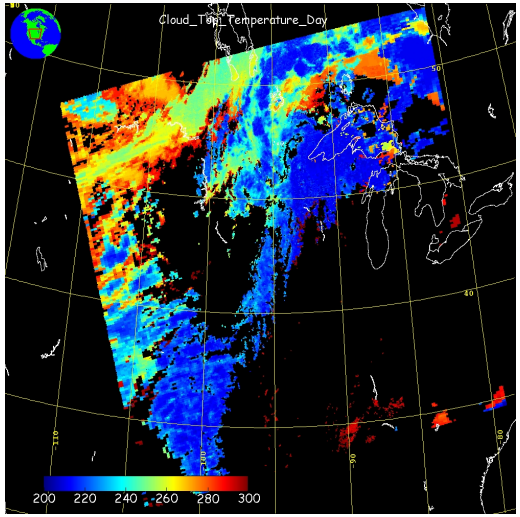
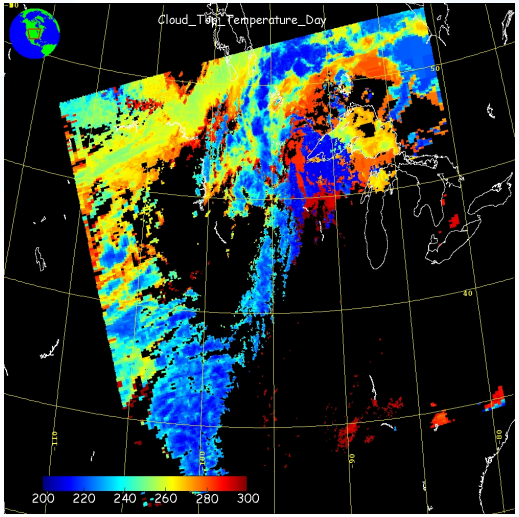
http://www.washingtonpost.com/national/health-science/chesapeake-takes-a-beating-from-storm/2011/09/13/gIQAKNVaQK_story.html

LANCE Data Products

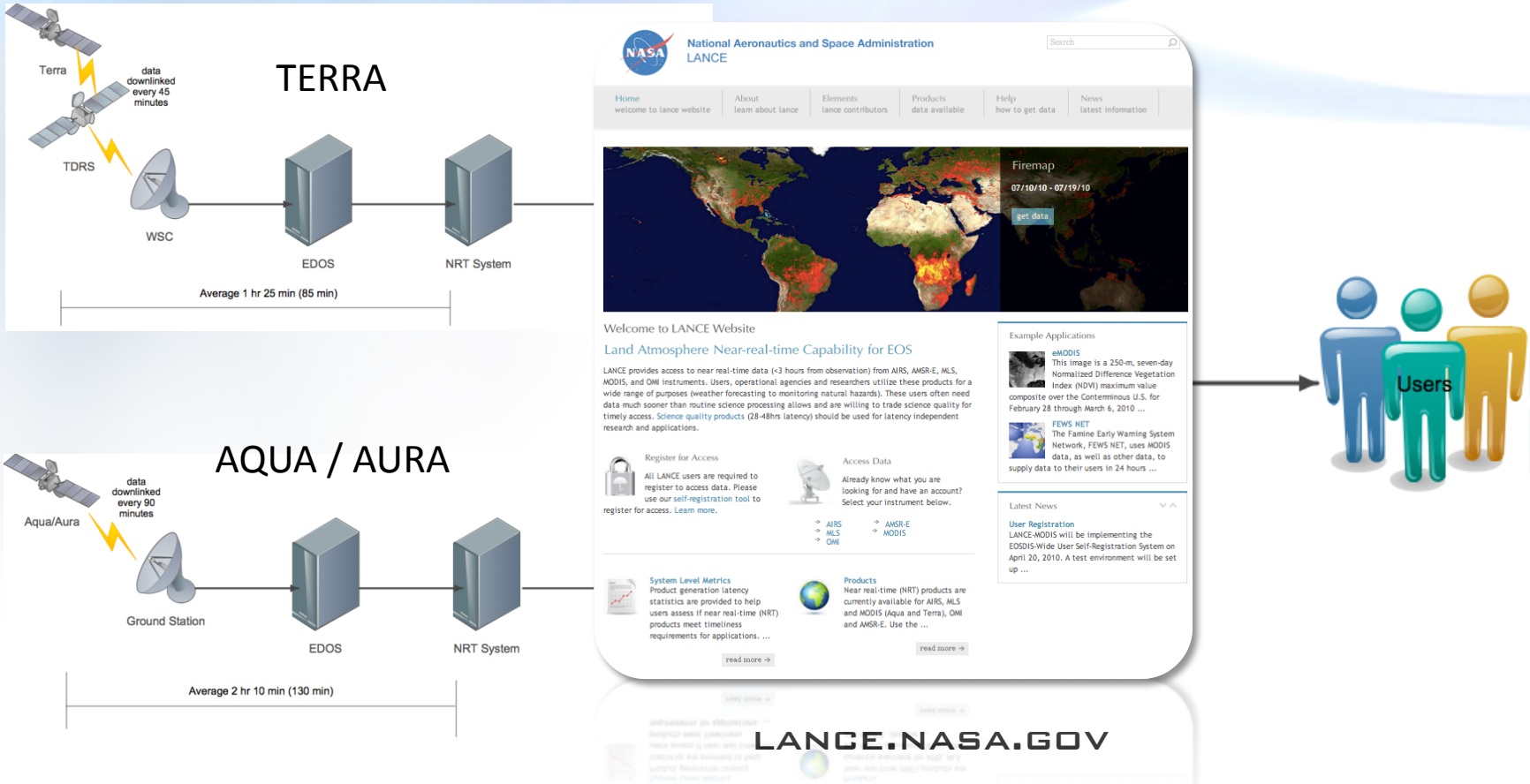
Instrument	Product Categories	Average Latency
AIRS	Radiances, Temperature and Moisture Profiles, Clouds and Trace Gases	1.3 – 2.3 hours
MLS	Ozone, Temperature	1.3 – 2.3 hours
MODIS	Radiances, Clouds/Aerosols, Water Vapor, Fire, Snow, Sea Ice, Land Surface Reflectance (LSR), Land Surface Temperature	1.5 – 2.3 hours excluding the L2G and L3 daily, tiled LSR products
OMI	Ozone, Sulfur Dioxide, Aerosols, Cloud Top Pressure	1.6 – 2.8 hours excluding L3 products
AMSR-E	Brightness Temperature, Soil Moisture, Rain Rate, Ocean Products, Snow Water Equivalent, Sea Ice	1.3 – 2.2 hours excluding L3 products

**Over 90 NRT data products are provided by LANCE

Comparison of NRT and Science Products

	Science Product	Near Real-Time Product
Land Surface Reflectance		
Cloud Top Temperature		

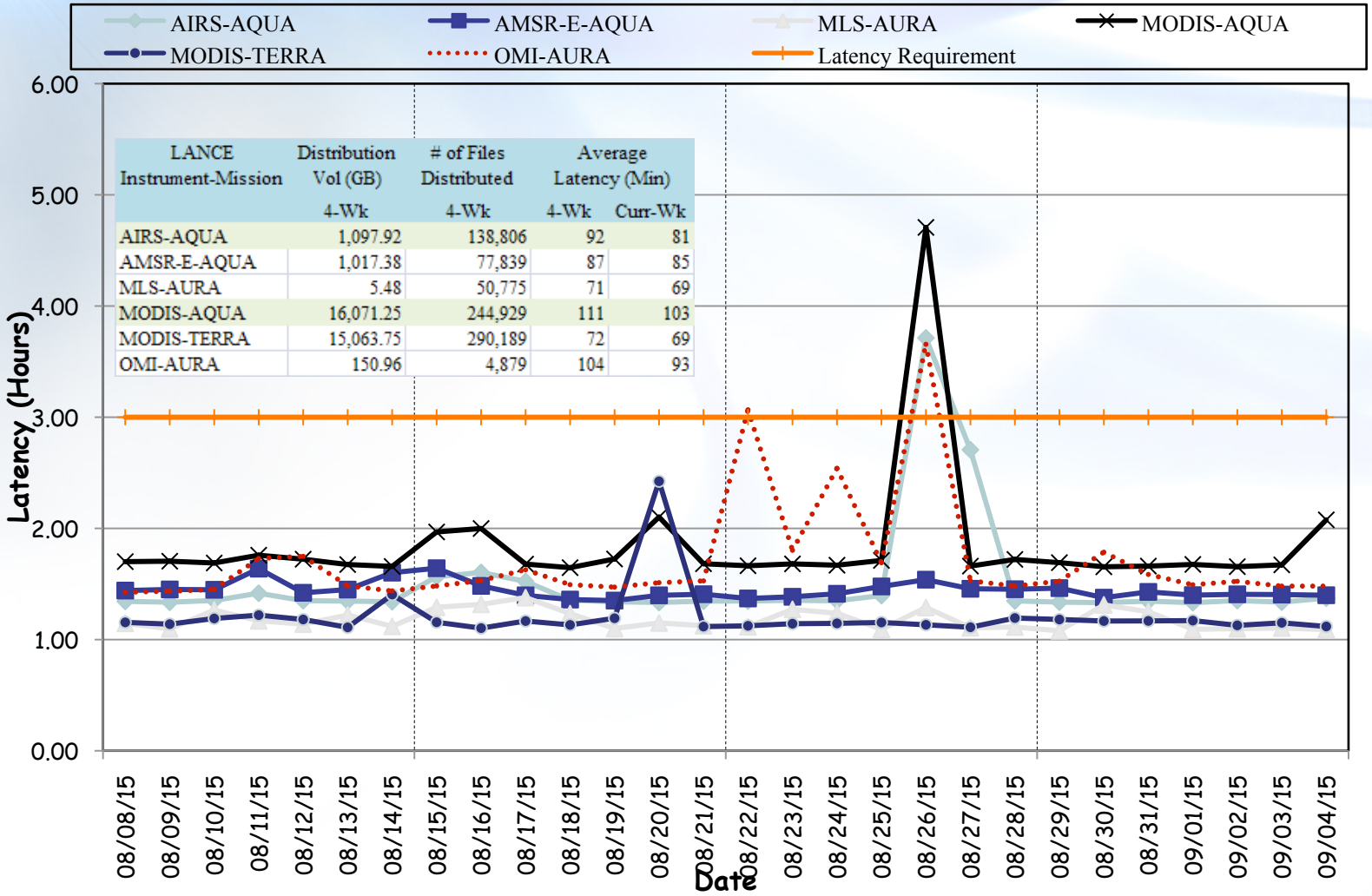
LANCE System Architecture



- Primary driver of latency is in the spacecraft to ground transmission. New approaches and capabilities are being evaluated to effect latency improvements.

Four Week LANCE-Wide Latency and Distribution Trend for Orbital Products

(August 7 - September 3, 2011)



LANCE Instrument-Mission	Distribution Vol (GB)	# of Files Distributed	Average Latency (Min)	
	4-Wk	4-Wk	4-Wk	Curr-Wk
AIRS-AQUA	1,097.92	138,806	92	81
AMSR-E-AQUA	1,017.38	77,839	87	85
MLS-AURA	5.48	50,775	71	69
MODIS-AQUA	16,071.25	244,929	111	103
MODIS-TERRA	15,063.75	290,189	72	69
OMI-AURA	150.96	4,879	104	93

Broker User - Flood Mapping

Current Flooding
MODIS data obtained
Sep 11-13 2010

Previous Flooding
(This Year)

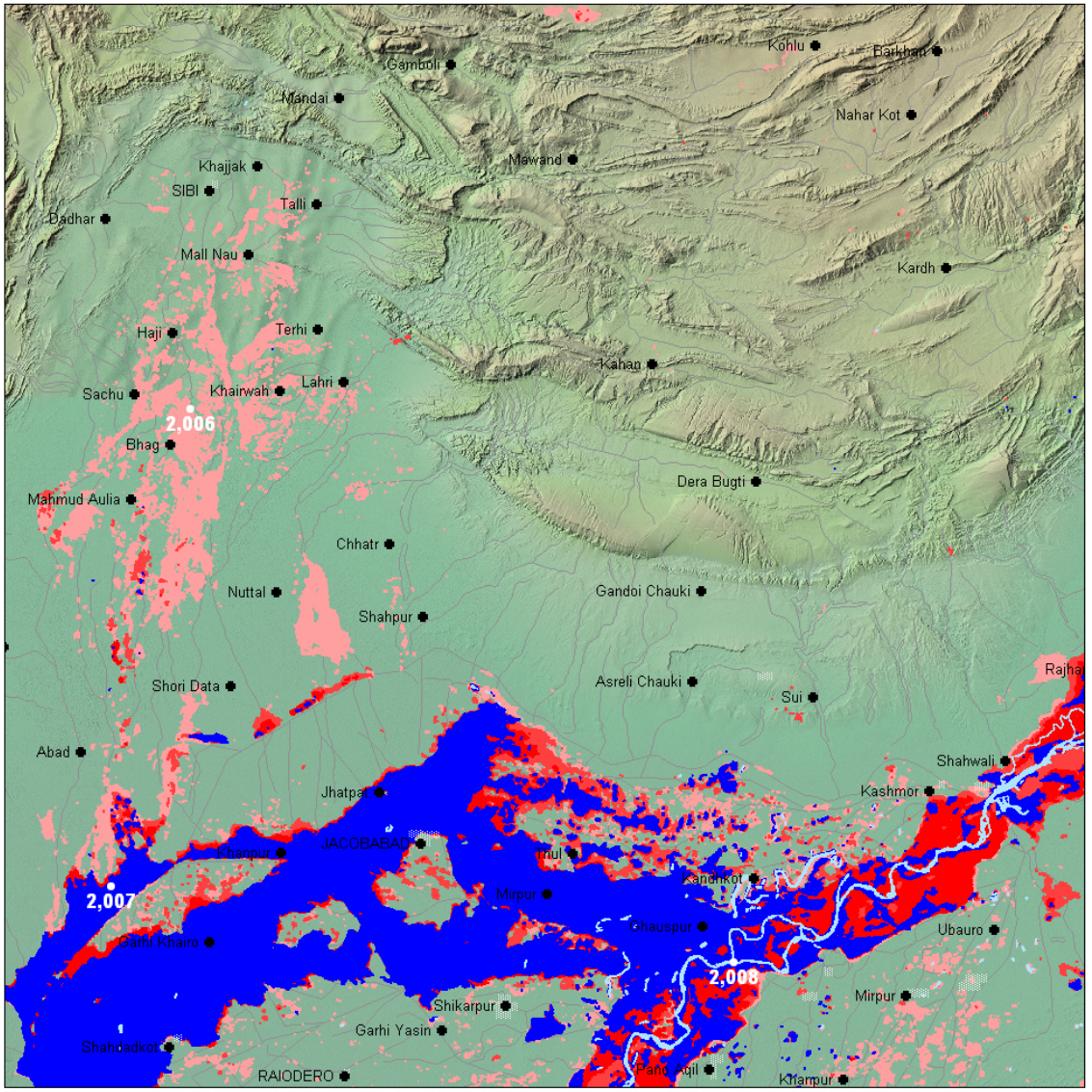
Post-1999 Flooding

Surface Water (SRTM)
February 17, 2000

Urban Areas

G. R. Brakenridge
CSDMS, University of Colorado

UTM Zone 43 North; WGS 84
Graticule: 2 degrees



LANCE Tools

Present

- LANCE elements provide a number of tools for the end user that allow the generation of different product formats (GeoTiff, netCDF, and BUFR), product sub-setting (band, parameter, and geographic), re-projection, and mosaicing
- The Rapid Response component of LANCE allows images to be downloaded for user-specified geographic subsets

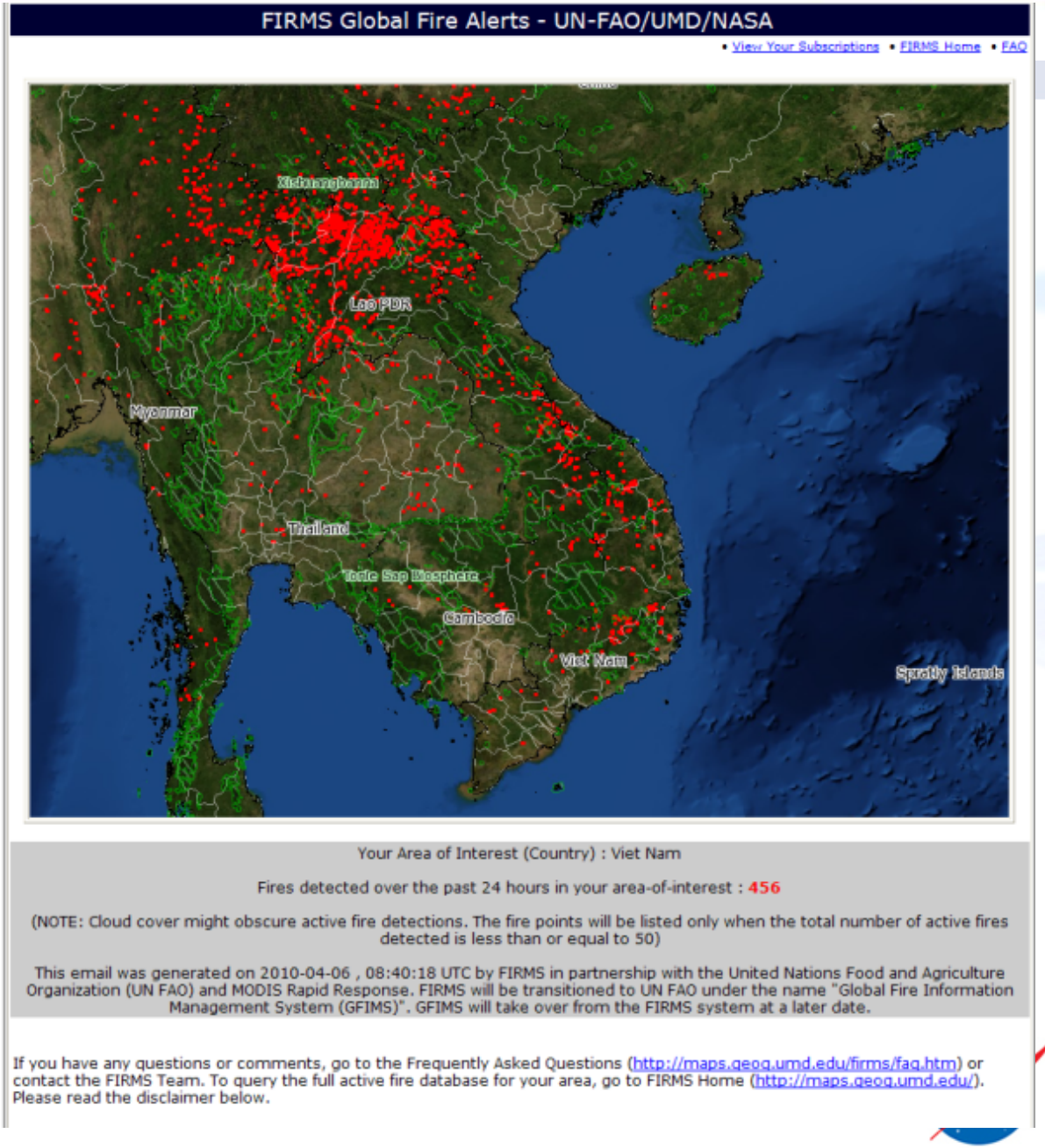
Planned Functionality for 2011

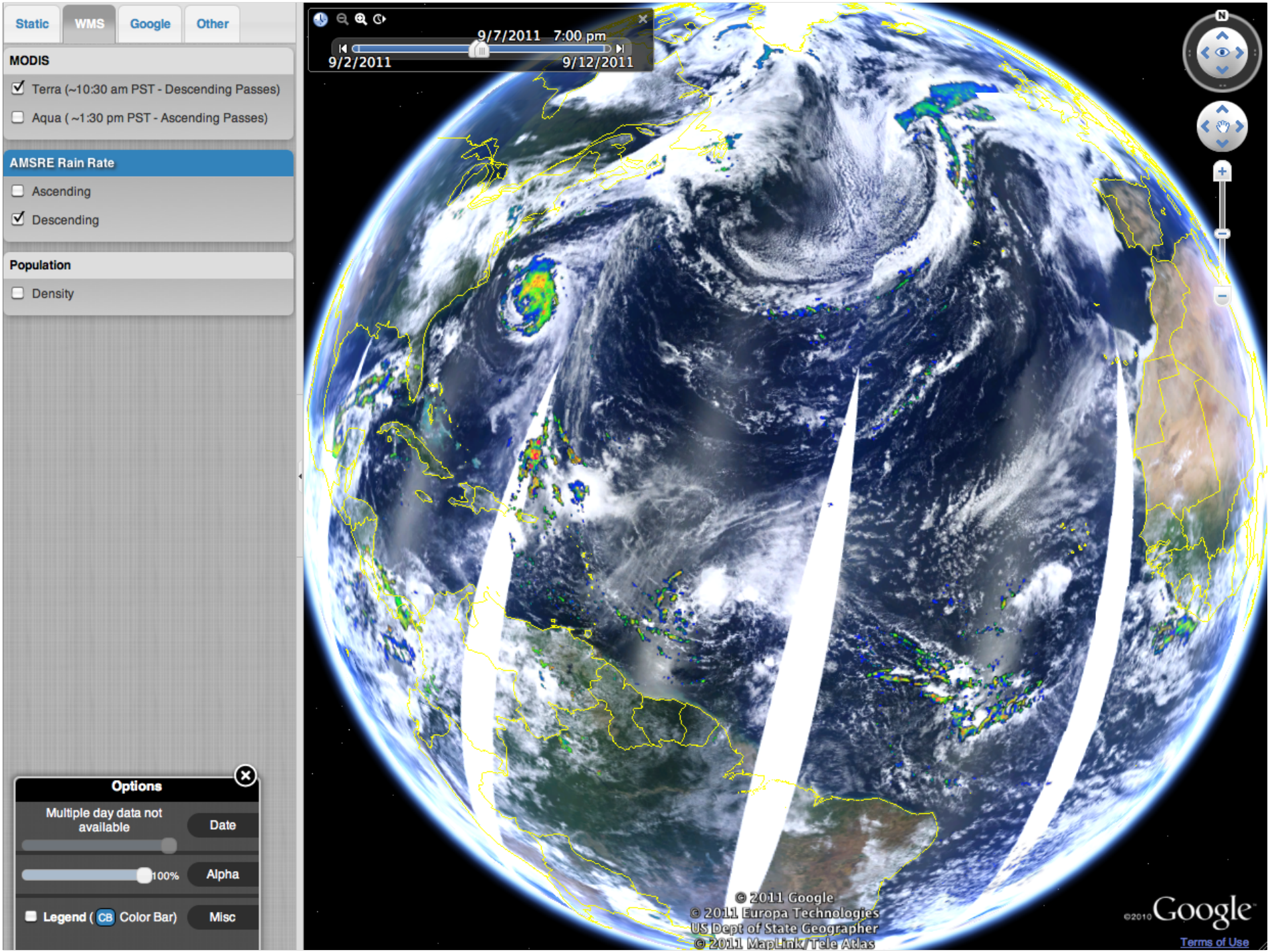
- The LANCE website will be migrate to http://earthdata.nasa.gov this fall
- A Web Mapping Service will be added to expedite user access to imagery
- Image data through Google Earth will be added in mid to late fall
- RSS Datacasting will be added to expedite user access to data and image products

FIRMS

FIRMS Email Alerts

- Customized alerts for subscribers area of interest (country, protected area, bounding box coordinates)
- Choice of daily, weekly, or near-real time alerts
- Available in English and Spanish
- At the end of January 2011 FIRMS had 4731 subscriptions, of these 3902 were English, 795 Spanish and 34 French.

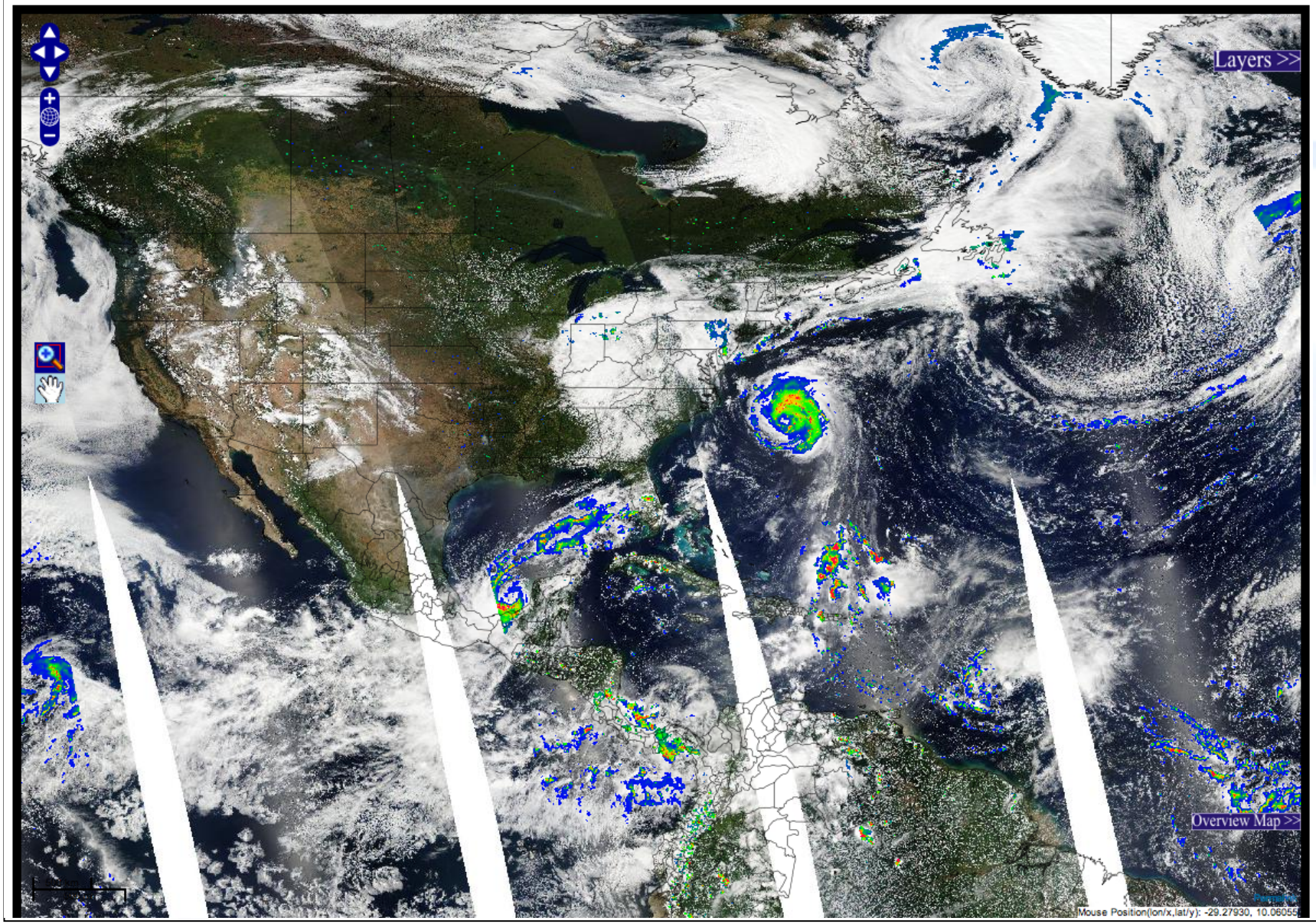



Static
WMS
Google
Other
MODIS
Terra (~10:30 am PST - Descending Passes)
Aqua (~1:30 pm PST - Ascending Passes)
AMSRE Rain Rate
Ascending
Descending
Population
Density
9/7/2011 7:00 pm
9/2/2011
9/12/2011
Options
Multiple day data not available
Date
100%
Alpha
Legend (CB Color Bar)
Misc
© 2011 Google
© 2011 Europa Technologies
US Dept of State Geographer
© 2011 MapLink/Tele Atlas
©2010 Google
Terms of Use

LANCE Web Mapping Service

Date: 09/08/2011

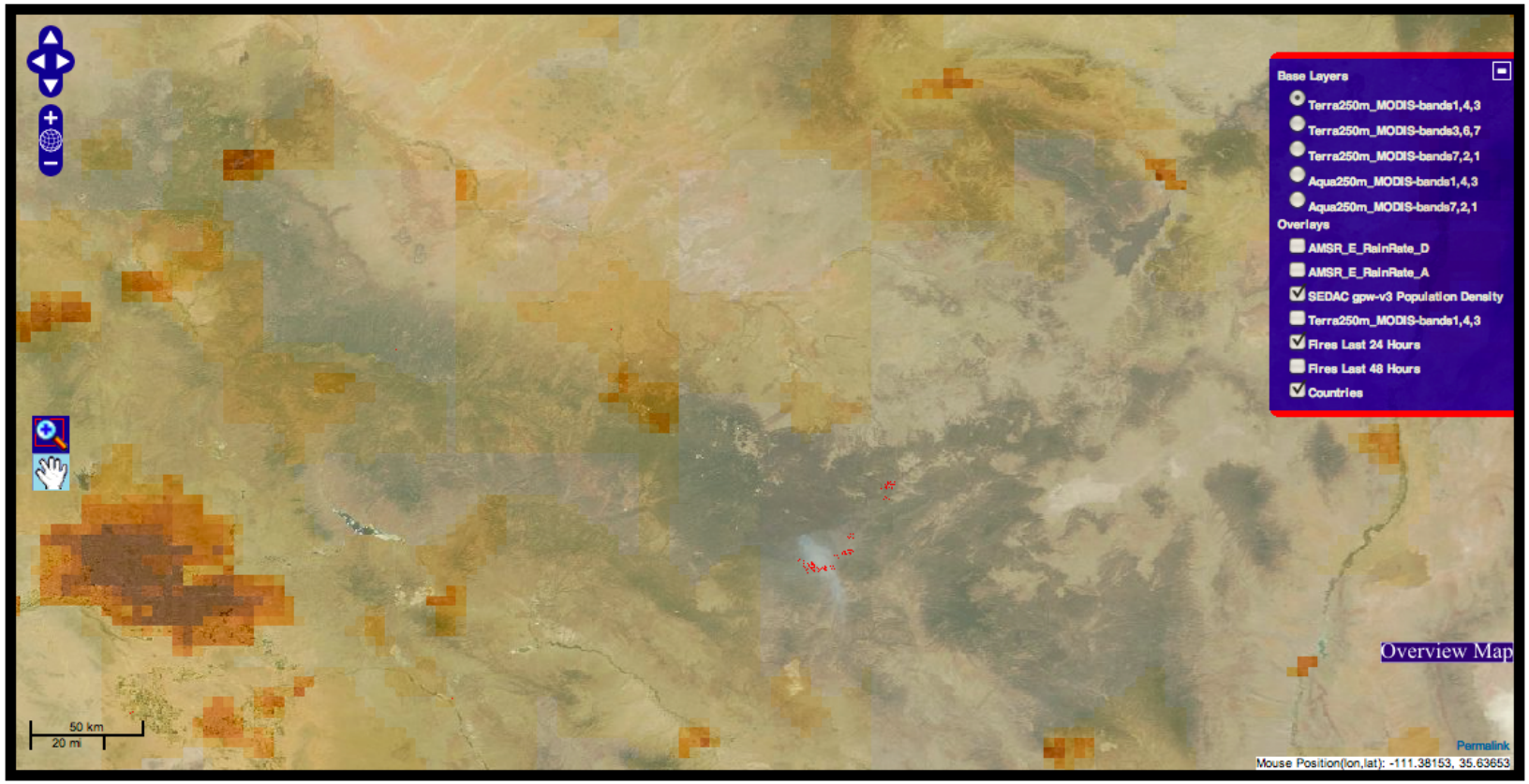
Current Base Layer: Aqua250m_MODIS-bands1,4,3



LANCE Web Mapping Service

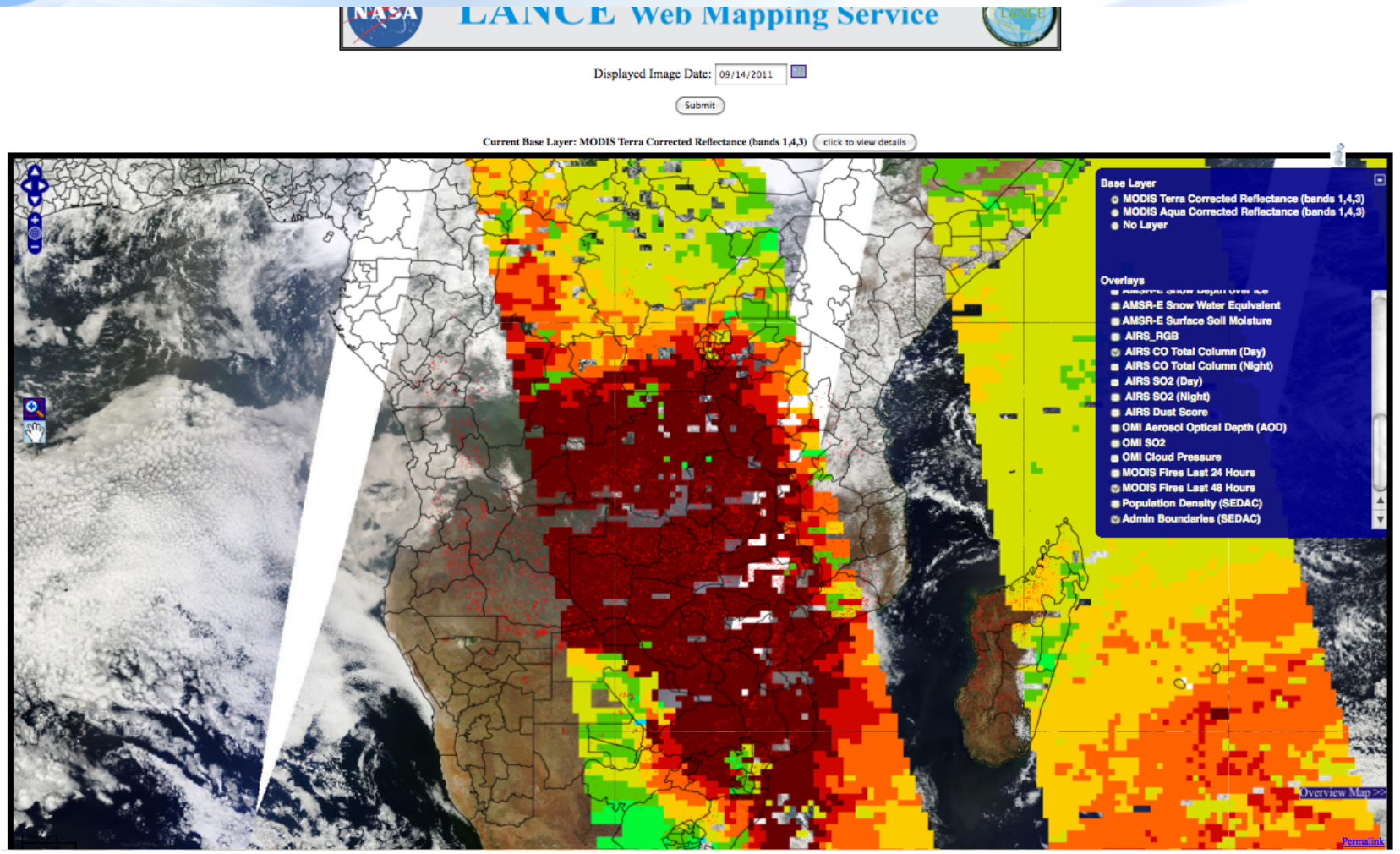
Date: 06/21/2011

Current Base Layer: Terra250m_MODIS-bands1,4,3



Download Legend

Pop.Dens. Layer Opacity: << 0.4 >>


LANCE Web Mapping Service
Displayed Image Date: 09/14/2011
Submit
Current Base Layer: MODIS Terra Corrected Reflectance (bands 1,4,3)
click to view details
Base Layer
MODIS Terra Corrected Reflectance (bands 1,4,3)
MODIS Aqua Corrected Reflectance (bands 1,4,3)
No Layer
Overlays
AMSR-E Snow Water Equivalent
AMSR-E Surface Soil Moisture
AIRS_RGB
AIRS CO Total Column (Day)
AIRS CO Total Column (Night)
AIRS SO2 (Day)
AIRS SO2 (Night)
AIRS Dust Score
OMI Aerosol Optical Depth (AOD)
OMI SO2
OMI Cloud Pressure
MODIS Fires Last 24 Hours
MODIS Fires Last 48 Hours
Population Density (SEDAC)
Admin Boundaries (SEDAC)
Overview Map >>
Permalink


LANCE – Land Atmosphere Near real-time Capability for EOS
http://lance.nasa.gov/
Rapid Response – LA...
Global Change Maste...
LANCE – Land Atmos...
National Aeronautics and Space Administration
LANCE
Home
Data Products
Imagery
User Community
Help
Acknowledgment | Acronyms | Contact Us | FAQ
Welcome to LANCE
Land Atmosphere Near real-time Capability for EOS
LANCE provides access to near-real time (NRT) data products from the MODIS (Terra and Aqua), AMSR-E (Aqua), AIRS (Aqua), MLS (Aura), and OMI (Aura) instruments in less than 3 hours of the observation time. Imagery is also available through the Rapid Response system and fire alerts, data, and a web mapping application are available through the Fire Information for Resource Management System (FIRMS).
LANCE supports a wide variety of applications users who are interested in monitoring natural and man-made hazards. Science quality products, that are generally available within 24 – 48 hours of observation, are available from other data centers to support science analysis. LANCE products are freely available but registration is required.
The following data centers are the elements that produce data for LANCE:
Fires in Texas and Oklahoma
Terra/MODIS from Sept. 05, 2011 at 17:05 UTC
AMSR-E SIPS
AMSR-E SIPS generates a variety of L2A, L2B, and L3 products including surface soil moisture, rain rate, snow water equivalent, and sea ice concentration. The daily, tiled L3 products are updated incrementally as new data become available. Browse data products and sub-setting tools are planned.
GES DISC
GES DISC provides L1 and L2 data products from the Aqua AIRS instrument suite and, in corporation with the MLS Team, L2 ozone and atmospheric temperature data from the MLS instrument aboard the Aura spacecraft. Several image formats from selected parameters are also available via a Web Map Service (WMS).
MODAPS
MODAPS provides a range of MODIS products from the Aqua and Terra spacecraft including clouds/aerosols, water vapor, fires, snow, sea ice, land surface reflectance, and land surface temperature. Browse data are available for most products. A variety of tools are available for sub-setting, re-projection, and generating several data formats.
OMI SIPS
OMI-SIPS provides products from OMI, a wide swath, nadir viewing, near-UV and visible spectrograph that measures ozone columns, aerosols, clouds, surface ultraviolet (UV) irradiance, and the trace gases Sulfuric Dioxide (SO2). Browse data are available for most products.
LANCE is now using the EOSDIS User Registration System. If you haven't already, please register for a username and password to access our FTP site.
Sign up
Announcements
August 30, 2011 - MODIS System Maintenance Tuesday, August 30, 2011 Completed
The MODIS system maintenance scheduled for Tuesday, August 30, 2011 at 06:30 AM EDT and the Rapid Response system maintenance scheduled for Tuesday, August 30, 2011 at 10:00 AM EDT have been completed. Any issues may be directed to ...
August 29, 2011 - MODIS System Maintenance Tuesday, August 30, 2011
MODIS will be performing scheduled maintenance on Tuesday, August 30, 2011 from 06:30 AM - 07:30 AM EDT. Near-real-time processing will be delayed and the FTP sites will be unavailable during the down time. We apologize for any ...
August 23, 2011 - Rapid Response System Maintenance Tuesday, August 30, 2011
The system maintenance scheduled for today, Tuesday, August 23, 2011 at 09:00am EDT, has been postponed until Tuesday, August 30, 2011 at 10:00am EDT. The primary web server which hosts the Rapid Response web pages will be down for ...
August 08, 2011 - EDOS Network Outage August 8, 2011
On Monday, August 8, 2011 between 15:00-17:00 EDT (19:00-21:00 GMT) network activities will cause several brief outages that may impact EOS product deliveries. This may result in near-real time processing delays. We apologize for any inconvenience this may cause.
Done


EOSDIS - Earth Data Website
earthdata.nasa.gov
NASA Earth Data
Data Discovery
Data Centers
Community
Science Disciplines
Search EOSDIS
National Aeronautics and Space Administration
EOSDIS
NASA's Earth Observing System Data and Information System
Home
About EOSDIS
Data
Our Community
User Resources
DISCOVER DATA & SERVICES
Data and Service Access Client
Reverb
Dataset Directory
GCMD
Search & Order Tools
EOSDIS Data Service Directory
Hurricane Katia
Hurricane Katia (12L) pictured on Sept. 5, 2011, in the Atlantic Ocean from Terra/MODIS. Check out the Lance we
more near-real time data products from EOSDIS.
EOSDIS WATCH
Files Processed
YESTERDAY: 112,145
LAST MONTH: 6,177,671
YTD: 44,407,673
As of Date: 2011-09-11
EARTH SCIENCE EVENTS
9/14/2011 - 9/14/2011 ESDIS/EOSDIS Meet and Greet
9/18/2011 - 9/23/2011 3rd iLEAPS Science Conference Garmisch-Partenkirchen, Germany
10/15/2011 - 10/18/2011 Association of Science - Technology Centers Annual Conference
more
EOSDIS NEWS
ESDIS and the EOS Data Centers Contributed to the Annual Ecological Society of America Meeting
ESDIS and EOSDIS at the Earth Science Information Partners (ESIP) Summer 2011 Meeting
The Aquarius Mission Launch
Article Published in IEEE GRSS Newsletter
Software Packaging for Reuse v1.0 Released
more
EOSDIS DATA CENTER NEWS
Arctic Sea Ice News & Analysis (NSIDC)
NSIDC Press Room
GES DISC News
LP DAAC News
LAADS Web News
PO.DAAC Animations and Images
SEDAC News
ABOUT EOSDIS
EOSDIS enables the collectio
processing, archive and distri
Earth science data.
AT A GLANCE

LOOKING FOR EARTH SCIENCE DATA?:

- Please join us in the main lobby of Bldg. 32 today, from 2-4 p.m., for a Meet-and-Greet with the NASA EOSDIS Data Center User Services Staff. Representatives from our data centers will be available to share information about user-friendly tools, data access tips, and an introduction to the types of data sets distributed by each data center. Visit: http://earthdata.nasa.gov